

REMARKS

Reconsideration and allowance of the above-referenced application are respectfully requested. The foregoing amendments are responsive to the July 18, 2001 Office Action. Applicants respectfully request entry of the requested amendments and reconsideration of the application in view of the following comments.

Response to the Rejection based on Double Patenting

Claims 6-12 and 14-23 were rejected under the judicially created doctrine of double patenting over Claims 48-56 of co-owned U.S. Patent No. 6,077,731. Applicants request to defer the response to the double patenting rejection until the 102 rejections are overcome. This will allow the applicant to determine the patentable scope of the claims during further prosecution, which may result in obviating the double patenting rejection.

Response to the Claim Rejections Under 35 U.S.C §§ 102

Claims 6-11, 14, 17-19, and 22-23 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,529,937 issued to Zhang, et al. The rejection asserts that Zhang allegedly teaches each element of the claims. Claims 6-12 and 14-

23 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,077,731 issued to Yamasaki, et al. The rejection asserts that Yamasaki allegedly teaches each element of the claims. Claims 6, 8-10, 12, 14, 17-19, and 23 are rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 5,616,506 issued to Takemura, et al. The rejection asserts that Takemura allegedly teaches each element of the claims.

The present invention as claimed is characterized in a method of manufacturing a semiconductor device comprising the steps of forming at least two metal added regions, crystallizing an amorphous semiconductor film using the two metal added regions, forming a crystalline semiconductor island as an active region using a crystallized portion from only one of the two metal added region while the other one is not used for forming the crystalline semiconductor island. The other metal added regions are only used for controlling the crystalline state.

With regard to Zhang, Figures 3(a)-3(e) and col. 13, lines 11-25 of Zhang teach that a nickel film is formed in an area 300. Crystals then grow in parallel with the substrate from the area 300 as shown by the arrow 305, and active layer areas 306 and 307 are formed by patterning. Thus, Zhang's active regions are formed using the crystallized portions from the nickel added region 300. In contrast, the present invention

as claimed includes another metal added region which is not used for forming an active semiconductor island. Further, Zhang does not suggest introducing the metal element to form the metal added region for controlling the crystalline state.

Yamazaki is similar to Zhang in that Yamazaki does not show forming a metal added region in which is not used for forming an active island from the crystallized portion. Yamazaki's metal introduced region is also not used for controlling the crystalline state, but rather for crystallizing an amorphous silicon film.

With regard to the Takemura rejections, Takemura teaches forming a nickel film 105 on an amorphous silicon film 103, heating the amorphous silicon film 103 to crystallize, patterning the crystallized film to form silicon islands 110 and 111. Thus, Takemura's nickel film 105 is also used to form the active islands 110 and 111. Therefore, Takemura also does not include the claimed dummy metal added region to control the crystal state of other crystalline regions.

In view of the foregoing distinctions, Applicants respectfully submit that independent Claims 6 and 9 are patentably distinguished over the cited art. Applicants respectfully submit that Claims 6 and 9 are in condition for allowance, and Applicants respectfully request allowance of Claims 6 and 9.

Claims 7-8, 10-12 and 14-23 depend either directly or indirectly from one of the independent claims. Each dependent claim further defines the independent claim from which it depends. In view of the foregoing remarks regarding Claims 6 and 9, Applicants respectfully submit that Claims 7-8, 10-12 and 14-23 are likewise in condition for allowance. Applicants respectfully request allowance of dependent Claims 7-8, 10-12 and 14-23.


Summary

In view of the above amendments and remarks, all of the claims should be in condition for allowance. A formal notice to that effect is respectfully solicited.

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Respectfully submitted,

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Version with markings to show changes made

In the claims:

Claim 6 has been amended as follows:

6. (Amended) A method of manufacturing a semiconductor device, said method comprising:

forming an amorphous semiconductor film on an insulating surface;

introducing a metal element being capable of promoting crystallization of the amorphous semiconductor film to form a first metal element added region and a second metal added region;

crystallizing the amorphous semiconductor film so that a crystal growth proceeds in a crystal growth direction parallel to the insulating surface from the first metal element added region and a second metal element added region thereby to form a first crystalline portion and a second crystalline portion, respectively, in a crystalline semiconductor film;

patterning the crystalline semiconductor film to form at least a crystalline semiconductor island using only the first crystalline portion while the second crystalline portion is not used to form the crystalline semiconductor island,

wherein carriers move in the crystalline semiconductor island in a carrier moving direction identical with the crystal growth direction,

wherein the metal element added region is located apart from the crystalline semiconductor island by a distance,

wherein the metal element added region has a length extending longer from an end portion of the crystalline semiconductor island in a longitudinal direction of the metal element added region.